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EXAMINER	
LOVEL, KIMBERLY M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/506,634	**Applicant(s)** FLANAGAN, ADRIAN	
	Examiner KIMBERLY LOVEL	**Art Unit** 2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _08 February 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _13-26_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _13-26_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This communication is in response to the Amendment filed on 8 February 2008.

2. Claims 13-26 are currently pending. In the Amendment filed 8 February 2008, claim 24 was amended. This action is made Non-Final.

3. The prior art rejections have been withdrawn as necessitated by applicant's arguments.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification fails to define the term computer-readable medium.

Claim Rejections - 35 USC § 112

5. The rejection of claim 24 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention has been withdrawn as necessitated by amendment.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. **Claim 24** is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

8. **Claims 24** is directed towards a program product comprising a computer readable medium. The specification fails to provide support for the term ”computer readable medium.” Therefore, when the term is interpreted by one of ordinary skill in the art, the term can be construed to cover non-statutory embodiments which improperly include network transmission lines (interpreted as wired and wireless transmission), wireless transmission media, signals propagating through space, radio waves, infrared signals, etc.

See, e.g., In re Nuitjen, Docket no. 2006-1371 (Fed. Cir. Sept. 20, 2007)(slip. op. at 18) “A transitory, propagating signal like Nuitjen's is not a process, machine, manufacture, or composition of matter.' … Thus, such a signal cannot be patentable subject matter.”

Therefore, the claimed subject matter fails to fall within on of the four statutory classes.

According to MPEP 2106:

> The claims lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 USC 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.
>
> Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” Both types of “descriptive material” are nonstatutory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally

interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)

Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored on a computer-readable medium, in a computer, or on an electromagnetic carrier signal, does not make it statutory. See *Diehr*, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in *Benson* were unpatentable as abstract ideas because “[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer.”).

9. To allow for compact prosecution, the examiner will apply prior art to these claims as best understood, with the assumption that applicant will amend to overcome the stated 101 rejections.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 13-20 and 24-26 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No 6,226,408 to Sirosh (hereafter Sirosh).

Referring to claim 13, Sirosh discloses a computer-implemented method, the method comprising:

determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points (see Fig 2); and

wherein a plurality of the weight vectors represents a single non-linear cluster (see column 4, lines 7-20);

performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers (see column 4, line 64 – column 5, line 22);

performing a second iterative process for iteratively updating a second data structure [next layer] utilizing results of the iterative updating of the first data structure [takes as its input a set of vectors from the one previous layer] (see column 4, lines 57-63 and column 5, lines 23-31); and

determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points [Batch Neural Gas takes into account the location of all input vectors when updating the cluster centers] (see column 6, line 22 – column 7, line 33),

wherein the method is an unsupervised method that is configured to be suitable for an on-line system [unsupervised] (see column 3, lines 22-28).

Referring to claim 14, Sirosh discloses the method according to claim 13, wherein each iteration in the first iterative process comprises selecting a winner weight vector for each data point on the basis of the distance between the data point and the weight vectors, and calculating a next value for each weight vector on the basis of the current value of the weight vector and a first neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector, and wherein the second data structure comprises a first coefficient for each of the weight vectors in the lattice structure and each iteration in the second iterative process comprises calculating a next value of each first coefficient based on: the current value of the first coefficient, and a combination of a first coefficient of the winner weight vector, a second neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector, and an adjustment factor for adjusting convergence speed between iterations (see column 6, lines 46 – column 7, line 42).

Referring to claim 15, Sirosh discloses the method according to claim 13, wherein the determining the weight vectors that correspond to cluster centers comprises selecting local maxima in the second data structure [ranking] (see column 7, lines 1-42).

Referring to claim 16, Sirosh discloses the method according to claim 14, wherein the combination is or comprises multiplication (see column 6, lines 46 – column 7, line 42).

Referring to claim 17, Sirosh discloses the method according claim 14, wherein the second neighborhood function is not monotonous (see column 9, lines 6-20).

Referring to claim 18, Sirosh discloses the method according to claim 14, wherein the first coefficients are limited to a range [0,1] and the second neighborhood function gives negative or positive values, respectively, for some distances (column 9, line 59).

Referring to claim 19, Sirosh discloses the method according to claim 14, wherein the second neighborhood function depends on a number of prior iterations (see column 9, lines 18-20).

Referring to claim 20, Sirosh discloses the method according to claim 13, wherein the input data points represent real-world quantities [real-world data] (Sirosh: see column 5, lines 52-58).

Referring to claim 24, Sirosh discloses a computer-readable program product comprising a computer program code embodied on a computer-readable medium, the computer readable program product being configured to control a processor to perform:

determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points (see Fig 2); and

wherein a plurality of the weight vectors represents a single non-linear cluster (see column 4, lines 7-20);

performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers (see column 4, line 64 – column 5, line 22);

performing a second iterative process for iteratively updating a second data structure [next layer] utilizing results of the iterative updating of the first data structure [takes as its input a set of vectors from the one previous layer] (see column 4, lines 57-63 and column 5, lines 23-31); and

determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points [Batch Neural Gas takes into account the location of all input vectors when updating the cluster centers] (see column 6, line 22 – column 7, line 33),

wherein the method is an unsupervised method that is configured to be suitable for an on-line system [unsupervised] (see column 3, lines 22-28).

Referring to claim 25, Sirosh discloses a computer, comprising:

first determination means for determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points (see Fig 2); and

wherein a plurality of the weight vectors represents a single non-linear cluster (see column 4, lines 7-20);

first performance means for performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers (see column 4, line 64 – column 5, line 22);

second performance means for performing a second iterative process for iteratively updating a second data structure [next layer] utilizing results of the iterative

updating of the first data structure [takes as its input a set of vectors from the one previous layer] (see column 4, lines 57-63 and column 5, lines 23-31); and

second determination means for determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points [Batch Neural Gas takes into account the location of all input vectors when updating the cluster centers] (see column 6, line 22 – column 7, line 33),

wherein the method is an unsupervised method that is configured to be suitable for an on-line system [unsupervised] (see column 3, lines 22-28).

Referring to claim 26, Sirosh discloses a computer, comprising:

a first determination unit configured to determine cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points (see Fig 2); and

wherein a plurality of the weight vectors represents a single non-linear cluster (see column 4, lines 7-20);

a first performance unit configured to perform a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers (see column 4, line 64 – column 5, line 22);

a second performance unit configured to perform a second iterative process for iteratively updating a second data structure [next layer] utilizing results of the iterative

updating of the first data structure [takes as its input a set of vectors from the one previous layer] (see column 4, lines 57-63 and column 5, lines 23-31); and

a second determination unit configured to determine, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points [Batch Neural Gas takes into account the location of all input vectors when updating the cluster centers] (see column 6, line 22 – column 7, line 33),

wherein the method is an unsupervised method that is configured to be suitable for an on-line system [unsupervised] (see column 3, lines 22-28).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. **Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,226,408 to Sirosh (hereafter Sirosh) as applied to claim 14 above, and further in view of US Patent No 5,809,490 to Guiver et al (hereafter Guiver).**

Referring to claim 21, Sirosh fails to explicitly disclose the further limitation wherein the first data structure is or comprises a self-organizing map. Guiver discloses an unsupervised clustering model which includes a first data structure (see abstract), wherein the first data structure is or comprises a self-organizing map (see column 7, lines 4-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the self-organizing map of Guiver as the type of first data structure disclosed by Sirosh. One would have been motivated to do so since Sirosh discloses unsupervised clustering, and it is well-known to one of ordinary skill in the art that a self-organizing map is just one of many unsupervised clustering techniques.

Referring to claim 22, the combination of Sirosh and Guiver (hereafter Sirosh/Guiver) teaches estimating an upper limit K for a number of clusters in the self-organizing map (Guiver: see column 6, lines 8-11 "It also computes a cutoff level K in step 252. As previously indicated, the cut-off level K is selected as some fraction of the average number of examples per cluster such as 70%." Examiner interprets the "cutoff level" to be equivalent to the "upper limit" as described in the claim.);

defining a coefficient vector .THETA.i=(.theta..sub.i,1, .theta..sub.i,2, ...theta..sub.i,K) for each weight vector i in the self-organizing map, the coefficient vector comprising K second coefficients .theta..sub.i,l, each of which represents a weighting between the weight vector i and a label l (Guiver: see column 9, lines 48-53 "After weights of the neighboring neurons have been adjusted, the learning coefficient alpha is maintained or decreased over each iteration in step 194. For instance, alpha may start

at a value such as 0.4 and decrease over time to 0.1 or lower. Similarly, the neighborhood $N_{cicj}(t)$ is either maintained or shrunk in step 196."); and

assigning cluster label l to weight vector i if: l=arg max .theta..sub.i,k. 1.ltoreq.k.ltoreq.K (Guiver: see column 10, lines 27-30 "The Kohonen neuron with the minimum distance is called the winner and has an output of 1.0, while the other Kohonen neurons have an output of 0.0") - In the instant application, the cluster label l is referred to as the "winner".)

Referring to claim 23, the combination of Sirosh/Guiver teaches a method according to claim 22, wherein each iteration in the second iterative process comprises calculating a next value of each second coefficient based on the current value of the second coefficient and a combination of: a coefficient of the winner weight vector, a third neighborhood function of distance (Guiver: see column 10, lines 6-12 "In each pass through the network, the node with a minimum distance between the input and its weight vector is considered the winner. Every node in the neighborhood is updated so that their weight vectors move toward the winner's vectors"); and

an adjustment factor for adjusting convergence speed between iterations (Guiver: see column 9 line 66 – column 10 line 2 "The neighbors of the winning neuron also adjust their weights to be closer to the same input data vector. The adjustment of neighboring neurons is instrumental in preserving the order of the input space in the SOM.")

Response to Arguments

14. In regards to Applicant’s arguments with respect to the 35 USC 101 rejection of claim 24, the rejection has been maintained since the specification fails to mention the term “computer readable medium” as explained above.

15. Applicant's arguments with respect to the prior art rejections of claims 13-26 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY LOVEL whose telephone number is (571)272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John R. Cottingham/
Supervisory Patent Examiner, Art Unit 2167

Kimberly Lovel
Examiner
Art Unit 2167

9 May 2008
kml